

### **REMARKS/ARGUMENTS**

Claims 1-8 remain pending in the instant application. Claims 1 and 5-7 have been amended.

In the latest office action, the Examiner objected to drawing Figure 3 for failing to include the reference sign "360" mentioned in the description. As reflected in the corrected drawing sheet enclosed herewith, Figure 3 has now been amended to provide this missing reference sign. Support for this amendment may be found in the specification as originally filed, at least at page 7, lines 25-28.

The Examiner also rejected claims 5-7 under 35 U.S.C. 112 ¶2 as being indefinite for failing to provide antecedent basis for the claim element "the tool". Claims 5-7 have now been amended to recite "the apparatus" in place of "the tool".

The Examiner had rejected pending claims 1-8 of the instant patent application as either anticipated or obvious in view of a number of references, including published PCT application WO 91/04213 to Wong et al. ("the Wong application"), U.S. patent no. 5,913,978 to Kato et al. ("the Kato patent"), and U.S. patent no. 6,034,000 Heyder et al. ("the Heyder patent"). These claim rejections are overcome as follows.

Embodiments in accordance with the present invention relate to semiconductor fabrication tools which include a plurality of antechambers selectively isolatable from a main load lock chamber. These antechambers can function in tandem to enable maximum efficiency of wafer handling, as the tool transfers wafers between various processing stages:

As wafers 214 are routed between the various processing stages of cluster tool 210, they may be housed in antechambers 204 and 206 to await an available tool processing chamber, or to await completion of processing of other wafers. For purposes of maintaining lot uniformity and ensuring error traceability, wafers generally remain associated with the same cassette throughout an entire semiconductor processing sequence. (Emphasis added; page 6, lines 4-9)

Moreover, as shown in Figure 5 of the instant application (reproduced below), embodiments of fabrication tools in accordance with the present invention are not limited to only two such antechambers.

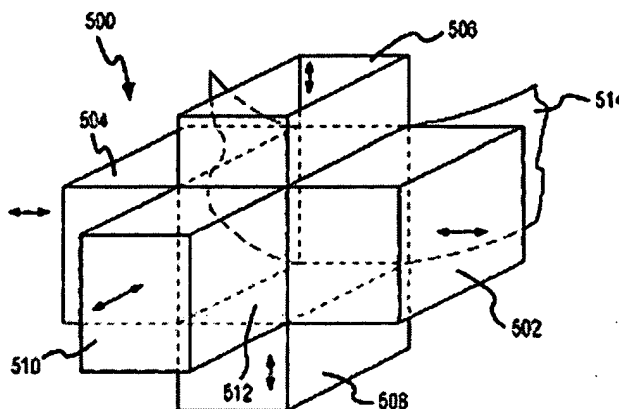


Fig. 5 presents a perspective view of yet another embodiment of a load lock structure 500 in accordance with the present invention. The orientation of antechambers 502, 504, 506, 508, and 510 relative to main load lock chamber 512 permits staging of four different batches of wafers during processing by tool 514. (Emphasis added; page 8, lines 17-21)

In order to emphasize the tandem operation of a multiplicity antechambers in accordance with the present invention, independent claim 1 has now been amended to recite:

1. An apparatus for processing a substrate comprising:
  - ... a first load lock antechamber configured to receive a first wafer batch, the first load lock antechamber in selective wafer communication with the second robot through a second slit valve,
  - a second load lock antechamber configured to receive a second wafer batch, the second load lock antechamber in selective wafer communication with the second robot through a third slit valve, and
  - a third load lock antechamber configured to receive a third wafer batch, the third load lock antechamber in selective wafer communication with the second robot through a third slit valve,
  - the first load lock antechamber, the second load lock antechamber, and the third load lock antechamber in fluid communication with a vacuum pump and selectively evacuable from the main chamber and from each other, the first, second, and third antechambers configured to function in tandem to enhance wafer handling efficiency. (Emphasis added)

Turning now to the references relied upon by the Examiner to reject the claims, the Wong application does describe a processing apparatus comprising a load lock having separately evacuable regions. However, the Wong application neither teaches nor suggests the use of more than two such chambers to receive a third wafer batch. The Wong application also fails to teach

or suggest that the evacuable load lock regions be utilized for staging in tandem in the manner taught by the instant application. Rather, the Wong application allocates this function to a separate staging chamber 20 having a pre-process station 21 and a post-process station 22. (See page 8, lines 13-16).

The Kato patent similarly fails to teach or even suggest either of the above-referenced aspects of the pending claims. Specifically, the Kato patent focuses upon the communication of wafers between clustered processing chambers and a load lock having only two separately evacuable portions. The Kato patent makes no mention of the use of more than two such chambers, or their operation in tandem in the claimed manner.

The Heyder patent is the third reference relied upon by the Examiner as a basis for rejecting claims of the instant application. The Heyder patent does describe a load lock configuration featuring more than two separately evacuable portions. However, the Heyder patent does not teach or even suggest that each of these separately evacuable portions could be configured to receive a separate wafer batch.

Specifically, the need for the tool described by the Heyder patent arises from a tool architecture wherein two wafers are processed simultaneously. Such a device would ordinarily require a substantially larger load lock portion that is able to simultaneously accommodate two wafer cassettes, with an attendant space occupancy penalty. (See col. 2, line 26 - col. 3, line 30) The Heyder patent design avoids this penalty by providing separate antechambers common to a main common load lock chamber, the antechambers oriented orthogonally relative to each other.

Nowhere, however, does the Heyder patent contemplate allocating separate batches of wafers to these antechambers, in the manner recited by the pending claims. Rather, the different antechambers of the Heyder patent design are dedicated to entry and exit of the wafers from the load lock in order to facilitate efficient processing of pairs of wafers from only two different batches.

Because neither the Wong application nor the Kato or Heyder patents, taken alone or in combination, teach or suggest tandem operation of more than two antechambers receiving more than two wafer batches, it is respectfully asserted that the pending claims cannot be viewed as

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anticipated or obvious in light of these references. Continued rejection of the claims on these grounds is therefore improper, and the claim rejections should be withdrawn.

Based upon the above amendments and remarks, it is respectfully asserted that the application as amended is now in condition for allowance. If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,



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